NON-PUBLIC?: N
ACCESSION #: 8806090182
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Kewaunee Nuclear Power Plant PAGE: 1 of 4

DOCKET NUMBER: 05000305

TITLE: Spurious Over Temperature Delta Temperature Trip Signal in Conjunction With Monthly Surveillance of Nuclear Instrumentation Causes Reactor Trip
EVENT DATE: 05/02/88 LER #: 88-006-00 REPORT DATE: 06/01/88

OPERATING MODE: N POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: David C. Lohman - Plant Reactor Supervisor TELEPHONE #: 414-388-2560

COMPONENT FAILURE DESCRIPTION:
CAUSE: X SYSTEM: JC COMPONENT: COMP MANUFACTURER: F180
REPORTABLE TO NPRDS: Y

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT: At 1124 on May 2, 1988, with the plant operating at 100% power the plant experienced a reactor/turbine trip. A spurious trip signal on the Channel IV Overtemperature Delta Temperature (OT DELTA T) trip circuitry in conjunction with the OT DELTA T function for channel I being tripped for performance of a monthly instrument check caused the reactor/turbine trip.

The monthly surveillance procedure SP 48-003E, Nuclear Power Range N41 Instrument Channel Test at >10% Power, requires that the reactor protection related to N41 be placed in a tripped condition. This included the Channel I OT DELTA T reactor trip. Faulty wires in the Channel IV OT DELTA T setpoint calculator made an intermittent connection causing the setpoint to spike. When the setpoint dropped below the Channel IV DELTA T value, which had remained constant, the 2 of 4 logic for OT DELTA T trip was made. This resulted in a reactor/turbine trip.

The root cause of the event was an equipment failure. The Foxboro box for the Channel IV OT DELTA T setpoint calculator had an intermittent connection between its connector plug and an internal circuit board due to faulty

wires. Had other reactor protection system testing not been in progress this failure would not have resulted in a reactor trip.

The wires identified as faulty were replaced and the setpoint calculator was reinstalled. A strip chart recorder was mounted locally and was checked periodically for several days following the plant's restart to verify the box was functioning correctly.

This event is being reported as required by 10 CFR 50.73(a)(2)(iv).

(End of Abstract)



Description of the Event

On May 2, 1988, at 1124, with the plant operating at 100% power the plant experienced a reactor (RCT)/turbine (TRB) trip. A spurious trip signal on the channel (CHA) IV Overtemperature Delta Temperature (OT DELTA T) trip circuitry in conjunction with the channel I OT DELTA T being tripped for the performance of a monthly instrument check caused the reactor/turbine trip.

At 1035 on May 2, 1988, a monthly surveillance procedure on the N41 Power Range channel was initiated. Surveillance procedure SP 48-003E, Nuclear Power Range N41 Instrument Channel Test at >10% Power, requires the channel I reactor protection related to N41 be placed in a tripped condition. This included the Channel I OT DELTA T reactor trip circuitry.

OT DELTA T provides protection for the reactor coolant system (AB) from departure from nucleate boiling. There are 4 channels of OT DELTA T protection, one for each DELTA T channel. A reactor trip is initiated when 2 of the 4 DELTA T channels exceed their associated OT DELTA T setpoints.

The OT DELTA T setpoint has inputs from several plant indicators. They are reactor coolant system average temperature, pressurizer (PZR) pressure, and the upper and lower power range (PR) detector (DET). The OT DELTA T trip circuitry is tripped during the performance of surveillance on the PR because of the upper and lower detector inputs.

At 1124 the OT DELTA T setpoint on Channel IV dropped below the DELTA T value for that channel. The DELTA T for Channel IV remained constant. This, in conjunction with Channel I being tripped for the monthly surveillance, made up the 2 of 4 logic causing a reactor/turbine trip. All plant systems responded to the trip as designed.

However, intermediate range N35 did remain upscale due to under compensation. This required the operator to manually unblock the source range detectors.

The operators followed the appropriate procedures for plant stabilization. The NRC was notified as required by 10 CFR 50.72(b)(2)(ii) at 1450.

The plant was held at hot shutdown while a post trip review was performed. Investigation by the Plant Instrument and Control group found faulty connections in the wires from the plug on the channel IV penalty calculator box to its circuit board. The spiking setpoint was recreated by physical movement of these wires. Repairs were initiated on the affected box.

At 1252, N41 and its associated trips were returned to service. The reactor was made critical at 1548. The channel IV OT DELTA T setpoint calculator was repaired and returned to service at 1715. The plant was reconnected to the grid at 1836.



Cause of Event

The root cause of the event was equipment failure. Faulty wires in the channel IV Foxboro setpoint calculator box TM404B made an intermittent connection causing spiking. During the post trip review additional indication of Channel IV OT DELTA T setpoingt erratic behavior was found. The setpoint had spiked high at 1120, approximately 4 minutes before the reactor trip. This was discovered in the review of the plant process computer logs. The review indicated that prior to 1120 there were no instances of channel IV OT DELTA T setpoint fluctuations; therefore, the operators had no forewarning of a potential problem.

A strip chart recorder was connected locally and erratic behavior was observed when moving the wires in question. After replacement of the wires this behavior could not be recreated.

It is felt that the faulty wires may have been due to age or were damaged during the shipment of this box from Foxboro following refurbishment during the recently completed 1988 refueling outage.

Had other testing not been in progress, this failure would not have resulted in a reactor trip. The erratic behavior of the setpoint would have been detected by the operators through the alarm associated with this function when it failed low or during periodic monitoring of control board

indications.

Analysis of Event

This event is being reported per 10 CFR 50.73 (a)(2)(iv) as an actuation of the reactor protection system and engineered safety features.

Plant operators followed the appropriate procedures and stabilized the plant. All plant systems responded as designed except for Intermediate Range nuclear flux detector N35 which remained upscale following the trip due to undercompensation. This required the operator to manually unblock the source ranges. Both reactor trip breakers opened, the turbine stop valves closed and the reactor was shutdown. Main feedwater regulating valves closed and the auxiliary feedwater pumps started.

Both steam generators were available throughout the event. Both emergency diesel generators started as required, although off-site power was available throughout the event. There was no impact on the health and safety of the public.



Corrective Actions

The wires that were identified as faulty during the post trip investigation were replaced. The setpoint calculator was reinstalled in the system with a strip chart monitoring its output. The strip chart was reviewed periodically for several days following the plant restart to verify the box was functioning properly.

This was determined to be an isolated event; therefore, further corrective actions are not necessary.

Similar Events

None.

Equipment Failure

The OT DELTA T setpoint calculator was supplied by Foxboro. The calculator is a model 66RC-OL, Electronic Consotrol Dynamic Compensator.



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June 1, 1988 10 CFR 50.73

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Gentlemen:

Docket 50-305
Operating License DPR-43
Kewaunee Nuclear Power Plant
Reportable Occurrence 88-006-00

The attached Licensee Event Report for reportable occurrence 88-006-00 is being submitted in accordance with the requirements of 10 CFR 50.73, "Licensee Event Report System."

Sincerely,
/s/ D. C. HINTZ
D. C. Hintz
Vice President - Nuclear Power

TJW/jms
Attach.
cc - INPO Records Center
Mr. Robert Nelson
US NRC, Region III

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